WHAT IS CLAIMED IS:

1. A method of plasma etching, comprising:

providing a substrate material;

providing a gas for generating a plasma, the gas including a first component and a second component selected such that varying the ratio of the first component to the second component varies the rate of etching of one location of the substrate relative to another location on the substrate; and

generating the plasma.

2. The method of claim 1, further comprising controlling the rate of etching at a peripheral portion and a central portion of the substrate material by selecting the amount of said first component and second component in the gas.

3. The method of claim 2, wherein the rate of etching near the peripheral portion is substantially equal to the rate of etching near the central portion.

4. The method of claim 1, wherein said first and second components are selected to generate different ratios of negative ions to electrons within the plasma.

5. The method of claim 1, wherein said first component comprises molecules C_xF_y, x and y being integers.

6. The method of claim 1 or 5, wherein said second component is selected from the group consisting of silicon fluoride, phosphorous fluoride, and sulfuric fluoride.

7. The method of claim 1, wherein the first component comprises molecules C_xF_y, x and y being integers, and the second component comprises SF_6.

8. The method of claim 7, wherein the first component comprises CF_4.

9. The method of claim 1, wherein the volume ratio of the first component to the second component is between about 100:1 to 5:1.

10. The method of claim 1, wherein the volume ratio of the first component to the second component is between about 50:1 to 10:1.

11. The method of claim 1, wherein the volume ratio of the first component to the second component is between about 25:1 to 15:1.

12. The method of claim 1, wherein the plasma is sustained by an electromagnetic field having a frequency of about 13 mega hertz.

13. The method of claim 1, wherein the plasma is sustained by a first electromagnetic field having a frequency of about 13

megahertz and a second electromagnetic field having a frequency of about 2 magahertz.

14. The method of claim 1, wherein the substrate material comprises a semiconductor wafer.

15. The method of claim 1, wherein the substrate material comprises a quartz plate.

16. The method of claim 2, wherein the rate of etching at the peripheral portion at least about 50 mm from the central portion is within about 1% of the rate of etching at the central portion.

17. The method of claim 1, wherein the first component is carbon tetrafluoride, the second component is sulfur hexafluoride, the volume ratio of (first component):(second component) is about 20:1, and the plasma is sustained by a first electromagnetic field having a frequency of about 13 megahertz and a second electromagnetic field having a frequency of about 2 megahertz.

18. A method of plasma etching, comprising:

providing a substrate material,

providing a gas for generating a plasma, the gas including a first component comprising molecules C_xF_y, x and y being integers, and a second component selected from the group consisting of silicon fluoride, phosphorous fluoride, and sulfuric fluoride; and

generating the plasma.

19. The method of claim 18 wherein the first component comprises CF_4 and the second component comprises SF_6.

20. The method of claim 18 or 19 wherein the volume ratio of the first component to the second component is about 20:1.

21. A method of controlling a plasma, comprising:

providing a chamber;

providing a gas for generating a plasma in the chamber, the gas including a first component and a second component, wherein the first component produces a positive ion plasma and the second component produces a negative ion plasma;

generating the plasma; and

controlling the ion distribution within the chamber by selecting the amount of the first component and the second component.

22. The method of claim 21 wherein the first component comprises molecules C_xF_y, x and y being integers, and the second component is selected from the group of sulfur fluoride, silicon fluoride, and phosphorus fluoride.

23. The method of claim 21 wherein the first component comprises CF_4 and the second component comprises SF_6.

24. An apparatus for etching a substrate material comprising:

a chamber;

a support located within the chamber to support the substrate material;

a high frequency energy source;

a first gas supply providing a first gas, the first etchant gas comprising C_xF_y molecules, *x* and *y* being integers;

a first inlet for introducing the first gas into the chamber to form a first plasma gas when energized by the high frequency energy source;

a second gas supply providing a second gas, the second etchant gas comprising S_pF_q molecules, *p* and *q* being integers; and

a second inlet for introducing the second gas into the chamber to form a second plasma gas when energized by the high frequency energy source.

25. The apparatus of claim 24, further comprising a flow controller for controlling the amount of the first and second etchant gases entering the chamber.

26. The apparatus of claim 24, wherein the first gas is carbon fluoride and the second gas is sulfuric fluoride.